

NITROGEN DOPING OF FSG LAYER

ABSTRACT OF THE DISCLOSURE

Embodiments of the present invention provide nitrogen doping of a fluorinated silicate glass (FSG) layer to improve adhesion between the nitrogen-
5 containing FSG layer and other layers such as barrier layers. In some embodiments, a nitrogen-containing FSG layer is deposited on a substrate in a process chamber by supplying a gaseous mixture to the process chamber. The gaseous mixture comprises a silicon-containing gas, a fluorine-containing gas, an oxygen-containing gas, and a nitrogen-containing gas. Energy is provided to the gaseous mixture to deposit the
10 nitrogen-containing FSG layer onto the substrate. A plasma may be formed from the gaseous mixture to deposit the layer. In some embodiments, an FSG film that has been formed is doped with nitrogen by a plasma treatment using a nitrogen-containing chemistry. For example, nitrogen ashing in a damascene process may introduce nitrogen dopants into the surface of the FSG layer. The nitrogen-containing FSG layer
15 exhibits good adhesion with barrier layers for copper such as those including tantalum, tantalum nitride, or the like.

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